view it will be the aim of the school to train the children carefully in habits of observation and clear reasoning, so that they may gain an intelligent acquaintance with some of the facts and laws of nature." The importance of practical work and manual instruction is duly emphasised. This recognition of the claims of natural knowledge to an honoured place in the work of our primary schools will go far to reward men of science for their efforts to convince educational authorities of the value of scientific training. It is to be hoped that elementary school teachers will take full advantage of their new charter, and show by the improvement of their work that they value their new freedom to educate on rational lines.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 5.—"On certain Physical and Chemical Properties of Solutions of Chloroform in Water, Saline, Serum, and Hæmoglobin. A Contribution to the Chemistry of Anæsthesia.—(Preliminary Communication.)" By Benjamin **Moore,** M.A., D.Sc., Johnston Professor of Bio-chemistry, University of Liverpool, and Herbert E. **Roaf,** M.B., Toronto, Johnston Colonial Fellow, University of Liverpool.

Summary and Conclusions.

(1) It is believed that the experiments recorded in this paper justify the conclusion that chloroform forms an unstable chemical compound or physical aggregation with the proteids experimented with, and that it is carried in the blood in such a state of combination. Since proteids build up the protoplasm of living cells, it appears to us probable that chloroform, and other anæsthetics, must form similar combinations with protoplasm, and that anæsthesia is due to the formation of such compounds which limit the chemical activities of the protoplasm. The compounds are unstable, and remain formed only so long as the pressure of the anæsthetic in the solution is maintained. Such compounds are formed not only by hæmoglobin, but by serum proteid, and hence the position taken by the anæsthetic in hæmoglobin is not that of the respiratory oxygen. This is further shown by the fact that the oxygen-carrying power of hæmoglobin is not interfered with in presence of chloroform.

The effect of chloroform upon various forms of protoplasm will form the subject of future experiments.

The facts upon which we rely as proofs of the formation of a compound or aggregation between chloroform and serum proteid or hæmoglobin may be summarised as follows:—

(*a*) Chloroform has a much higher solubility in serum or hæmoglobin solutions than in saline or water.

(*b*) *Even in dilute solutions* at the same pressure the amount of chloroform dissolved in serum or hæmoglobin solution is considerably higher than in saline or water.

(*c*) The curve of pressures and concentrations in the case of water and saline is a straight line, while in the case of serum and hæmoglobin solution it is a curve, showing association at the higher pressures.

(*d*) In the case of serum, chloroform causes a marked opalescence, and also a slow precipitation at room temperature (15° C.), and at body temperature (40° C.) a rapid, though incomplete precipitation. In the case of hæmoglobin, 1·5 to 2 per cent. of chloroform causes a change of colour and commencing precipitation at room temperature, which becomes almost complete in the thermostat at 40° C., while 5 per cent. and over causes complete precipitation even at 0° C.

(2) The relations between chloroform pressure and concentration in solution have been worked out throughout a long range, from below the anæsthetising values (8 to 10 mm.) to nearly saturation in the case of water, saline, and serum.

Attention may be directed here to the important practical fact that with the same percentage of chloroform in the air breathed, serum or hæmoglobin, and therefore the blood will take up much more chloroform than would water or saline under equal conditions. Thus at the anæsthetising pressure, and at 40° C., the coefficient of distribution in the case of water and saline is approximately 4·6, while that of serum is 7·3; at room temperature (15° C.) these coefficients become 8·8 and 17·3 respectively.

"Note on the Lymphatic Glands in Sleeping Sickness." By Captain E. D. W. **Greig,** I.M.S., and Lieut. A. C. H. **Gray,** R.A.M.C.

The authors have examined the contents of lymphatic glands during life from fifteen sleeping sickness patients. In all of them actively motile trypanosomes were very readily found in cover-glass preparations taken from the cervical glands. They were also present in other glands, such as the femoral, but were not nearly so numerous.

The authors consider that their observations throw a new light upon the glandular enlargements which have been so constantly noticed in sleeping sickness, and that the disease is essentially a polyadenitis brought about by the arrest of the trypanosomes in the glands where many of them are destroyed, but whence some escape from time to time into the blood stream and thus occasion the increase which has been observed in the peripheral circulation.

They regard their observations upon the presence of trypanosomes in number in the lymphatic glands of both early cases of trypanosomiasis and advanced cases of sleeping sickness as affording important evidence of the unity of these diseases, and further proof that the trypanosomes are the essential cause of sleeping sickness.

"A Note on the Action of Radium on Micro-organisms." By Dr. Alan B. **Green.** Communicated by Sir Michael Foster, K.C.B., F.R.S.

The radium salt used in these experiments was 1 centigram of practically pure radium bromide, contained in a vulcanite and brass capsule fronted with thin talc. The emanations applied to micro-organisms were the β and γ rays.

(1) In the first set of experiments the germicidal action of these rays on various species of bacteria was investigated. A mass of bacteria was placed, as a thin layer, in a hollow-ground glass slide, and the capsule containing the radium was placed over the mass in such a way that the radium was brought within 1–2 mm. of it. All experiments and controls were made at room temperature.

It was found that the specific germ of vaccinia was killed by an exposure to radium of 22 hours or less. Non-spore-bearing bacteria were killed generally by 2 to 14 hours' exposure to radium, while spores were not killed by less than three days' exposure. It was further found that (*a*) as the distance between the radium and the bacteria was increased germicidal action became less evident and finally ceased; (*b*) as increased thicknesses of lead were interposed between the radium and the bacteria, *i.e.* as the β rays were cut off, germicidal action became less and less evident.

(2) It was ascertained that after exposure to radium at a distance of 1–2 mm. for 24 to 120 hours, micro-organisms themselves became radio-active. It has not yet been ascertained whether living micro-organisms can exhibit induced radio-activity, but micro-organisms killed by radium emanations show this activity. No radio-activity was found in bacteria not previously exposed to radium. The induced radio-activity of bacteria was shown by the ability of a mass, after exposure to radium, to photograph itself when brought into apposition with the film of a sensitised photographic plate. The best photographs so far have been obtained from cultures containing spores. Radio-active organisms have given off photo-actinic emanations after three months have elapsed since their exposure to radium. Photographs of such bacterial masses have been obtained through a double layer of lead foil, but as the β rays were cut off by interposing greater thicknesses of lead the passage of photo-actinic rays to the sensitised film was prevented.

"Further Note on some Additional Points in Connection with Chloroformed Calf Vaccine." By Dr. Alan B. **Green.** Communicated by Dr. W. H. Power, C.B., F.R.S.

Since a former paper on this subject was read in April, 1903, the use within two weeks of their collection from the calf of a large number of vaccine lymphs prepared by the chloroform process has resulted in high "case" and "insertion" success.

The following further points in connection with these vaccines have been investigated:—

(1) The temperature at which vaccine water emulsion is

subjected to the chloroform process determines largely the rate at which the extraneous bacteria of that emulsion are eliminated. The temperature at which extraneous bacteria are killed most quickly, the specific germ being left meanwhile in a state of full activity, lies probably between 18° C. and 23° C.

(2) It has been found that several additional species of bacteria are rapidly eliminated from vaccine by means of the chloroform process:—*B. proteus vulgaris, B. prodigiosus, B. pyocyaneus, B. fluorescens liquefaciens, B. coli communis, B. typhosus, B. diphtheriae, B. mallei, B. pestis, B. tuberculosis* and *S. cholerae Asiaticae*. These bacteria were added artificially to vaccine collected for experiment only.

(3) The keeping properties of chloroformed vaccine have been investigated. Vaccines prepared by the chloroform process were stored for the same length of time as commonly elapses at these laboratories between the collection from the calf and use of lymphs prepared by glycerination—usually six weeks. The use of these stored chloroformed lymphs was attended with results of high "case" and "insertion" success.

Thus the further use of a large number of chloroformed vaccines confirms the conclusions arrived at in a former paper, and the important additional knowledge has been gained that chloroformed vaccine, if originally of sufficiently high potency, will, when prepared and stored under suitable conditions, retain potency in a high degree for a considerable time.

Linnean Society, May 5.—Prof. S. H. Vines, F.R.S., president, in the chair.—Colour and coloration in mammals and birds: J. L. **Bonhote.** In this the author brought forward further facts in support of the theory that the colour and coloration on animals are primarily due to physiological causes, and showing that where conditions of "high vigour" existed, the animals were as a rule deeply coloured. The second part of the paper dealt with the coloration, and examples were brought forward showing that before a moult the hair bleached along certain definite areas, and also that this bleaching was not a process continuing throughout the period between the moults; but confined as a rule to a few days or weeks immediately preceding the moult. Hence it was argued that both colour and coloration were primarily due to physiological causes, and that natural selection could only make use of those markings which were in the first place due to "vigour."—The cranial osteology of the fishes of the families Mormyridæ, Notopteridæ, and Hyodontidæ: Dr. **Ridewood.** Descriptions were given of the skulls of *Mormyrops deliciosus, Petrocephalus bane, Notopterus kapirat* and *Hyodon alosoides*, together with less complete accounts of those of Marcusenius, Gnathostomus, Hyperopisus, Mormyrus and Gymnarchus. As the result of a study of the skulls of these forms, Dr. Ridewood concludes that the families Mormyridæ, Notopteridæ and Hyodontidæ, though more closely related *inter se* than is either family with any other family of malacopterygian fishes, are not more intimately related with one another than was previously assumed to be the case.

Faraday Society, May 9.—Mr. Bertram Blount in the chair.—Studies in viscosity: Dr. C. E. **Fawsitt.** The paper referred to some relations of viscosity to salt formation and viscosity as an additive property.—The electrolytic oxidation of anthracine: Dr. F. M. **Perkin** and A. **Fontana.** The authors have taken up the study of the oxidation of anthracine primarily to ascertain whether it was possible to obtain a good laboratory method for the preparation of anthraquinone. The first attempts were made with solutions in acetone, platinum electrodes being employed. Although oxidation took place in solutions of anthracine in acetone, it was not found possible to oxidise more than about 55 per cent. of the anthracine. Attempts were then made to electrolyse anthracine suspended in 20 per cent. sulphuric acid, or in caustic alkali to which an oxygen carrier had been added. Various carriers were employed, the most satisfactory being chromium, cerium or manganese salts.

Geological Society, May 11.—Mr. H. B. Woodward, F.R.S., vice-president, in the chair.—On some quartzite-dykes in mountain-limestone near Snelston (Derbyshire): H. H. **Arnold-Bemrose.** The quartzite of these "dykes" consists of angular detritus, quartz-grains with enclosures, a few small grains of felspar, and a few shreds of mica. The grains are cemented by silica, and sometimes by calcite. The silica is present in the limestone in two forms, which have had an entirely different origin. An important bed of sandstone was found by sinking for a well at Marston Common Farm, and the same bed is found also about 800 feet south of the farm. The microscopic aspect of the rock is precisely similar to that of the dykes. It is at a period later than the Keuper that the silica which cemented the sandstone of the dykes and of the Common Farm appears to have been introduced.—Phenomena bearing upon the age of the Lake of Geneva: Dr. C. S. **Du Riche Preller.** The author has examined the low-level gravel-beds and other alluvia in the Rhone Valley. After describing the phenomena around the Lake of Geneva, and comparing them with those around the Lake of Zurich, he draws the following conclusions:—The low-level gravel-beds of the Rhone Valley near Geneva are fluviatile deposits of the second inter-Glacial period, and were formed before the present deep lake-basin. The high-level gravel-beds of La Côte above Rolle and of the Jorat district above Lausanne are true Deckenschotter. Hence the term "alluvion ancienne" should only apply to the high-level deposits. The formation of the present deep lake-basin of Geneva was primarily due to the lowering of the valley-floor by flexures of the Molasse and its contact-zones, posterior to the maximum glaciation. The author holds that the Lake of Geneva, together with the other principal zonal lakes between the Alps and the Jura, was formed under similar conditions and at the same time as the Lake of Zurich, that is, towards the close of the Glacial period.

Zoological Society, May 17.—Mr. Howard Saunders, vice-president, in the chair.—The fifth of a series of papers by Sir Charles **Eliot,** K.C.M.G., on Nudibranchs from Zanzibar and East Africa, was read. Twenty species were treated of in the paper, of which eleven were described as new.—Mr. G. A. **Boulenger,** F.R.S., described a new species of tree-frog of the genus Hyla, from British Guiana, carrying eggs on the back.—Mr. F. E. **Beddard,** F.R.S., read a paper containing notes on the anatomy of certain species of snakes of the family Boidæ.—A communication from Dr. G. Stewardson **Brady,** F.R.S., contained an account of a collection of Entomostraca made in Natal by Mr. James Gibson. Eleven species were enumerated in the paper, of which nine were described as new, one being made the type of a new genus.

Royal Microscopical Society, May 18.—Dr. Dukinfield H. Scott, F.R.S., president, in the chair.—A note by Mr. A. A. C. Eliot **Merlin** on Mr. Nelson's new formula amplifier was read. The amplifier, which consists of a negative lens placed in the rear of the objective, was calculated by Mr. Nelson at the request of the author to enable him to make some delicate microscopical measurements. With the usual arrangement of a low power eye-piece and screw micrometer, the magnification afforded by objectives of high power was insufficient to ensure accuracy in all cases, and it was not desirable to use more powerful eye-pieces, as the spider lines then appeared too coarse. The author found the amplifier yielded especially good results when used for micrometrical purposes, and he suggested the application of it to students' microscopes for quickly obtaining an increase of magnifying power. Mr. Nelson's formula for the amplifier was given.—A note on Grayson's 120,000 band plate by Mr. **Nelson** was then read. The band was resolved strongly by an apochromatic oil immersion 1/8, 1·43 N.A., and a 5 eye-piece; it was also resolved by a semi-apochromatic 1/10, 1·3 N.A., and a 5 eye-piece, and by an old achromatic water immersion 1/12, 1·2 N.A.; in this case the lines appeared to have irregularities. The 90,000 band was resolved by an apochromatic of 4 mm., 0·97 N.A., quite easily, and by a $\frac{1}{4}$ dry apochromatic $\frac{1}{4}$, 0·96 N.A., with some difficulty. The author remarked in passing that the latest books on physical optics state that 1/90,000 inch is the theoretical limit for microscopic vision. After giving particulars of the resolution of other bands, Mr. Nelson stated that ruled lines are more difficult to resolve than diatoms of equal fineness. He said the best screen for work of this kind is made from a saturated solution of acetate of copper many times filtered, to which a very small quantity of methylene blue should be added. Sunlight with a heliostat was used, and the light made oblique in one azimuth. The theoretical resolving limit for oblique light may be *roughly* taken at 100,000 times the N.A. of the objective. Dr. Hebb said he saw this plate exhibited at the Royal Society's conversazione, and though it was certainly resolved, he remarked that some of the lines appeared weaker than others. Mr. E. E. Hill said this was due to the fact that the objective used had an aperture of only 1·1 N.A.

DUBLIN.

Royal Dublin Society, April 19.—Prof. E. J. McWeeney in the chair.—Mr. G. H. **Carpenter** read a paper on injurious insects, &c., observed in Ireland during the year 1903. The prevalence of the black-currant mite (*Eriophyes ribis*) in certain districts was mentioned, and attention was directed to the economic importance of some species of springtails (*e.g. Achorutes armatus* and *Lipura ambulans*) on account of their habit of attacking healthy seeds and fruits.—Prof. J. A. **McLelland** read a paper on the penetrating radium radiation. As the γ rays act in some ways more like charged particles than like Röntgen rays, the author has made experiments to test directly whether or not a charge is carried by the γ rays. No charge was detected. The sensitiveness of the apparatus is defined by showing how small a fraction of the β radiation could have been detected by means of the charge on the β particles. The second part of the paper deals with the absorption of γ rays by different substances, and it is shown that these rays are to some extent heterogeneous, and that the absorption-density law is followed with remarkable closeness when one deals only with the most penetrating of the γ rays.—Dr. W. E. **Adeney** made a further communication on photographs of spark-spectra from the 21·5 feet Rowland spectrometer in the Royal University, Dublin. In this paper the author deals with the wave-lengths of the lines in the ultra-violet spark-spectra of platinum and chromium. These have been calculated from measurements made from photographs of the first order of spectra, reproductions of which were published in the first part of this work (*Trans.* Roy. Dubl. Soc., vol. vii., 1901, p. 331). Kayser's measurements of well defined lines in the arc-spectrum of platinum have been employed as standards.—Prof. E. J. **McWeeney** read a paper on the cases of carbon-monoxide asphyxiation that have occurred in Dublin since the addition of carburetted water-gas to the ordinary coal-gas. Attention was first directed to the increase of carbon-monoxide in the Dublin coal-gas by Prof. Emerson Reynolds, F.R.S., in a paper read before the Royal Dublin Society in 1900 (*Scientific Proceed.*, vol. ix. p. 304). Analyses made for Prof. McWeeney by Mr. J. Holm Pollok showed 17·2, 16·8 and 14·6 per cent. of CO respectively. The author proceeded to recount in detail the circumstances attending seven fatal cases that had come under his notice during the past three years, each of which presented special features of interest. In one of the cases, which had a fatal termination, the hæmoglobin of the blood was saturated to the extent of 73 per cent. with carbon monoxide; in another the latter amounted to 87·7 per cent. The victim in this case, a young man, was asphyxiated in his bath by the CO-containing fumes escaping from a badly constructed and unventilated "geyser." The author concluded by emphasising the need for increased caution imposed by the more deadly nature of the gas now supplied.

PARIS.

Academy of Sciences, May 24.—M. Mascart in the chair.—On the limits of sensitiveness for odours and emanations: M. **Berthelot**. The rate of loss of musk and iodoform under certain conditions is compared with emanations from a small quantity of a foreign element mixed with a large quantity of an element not giving an emanation.—On γ-diphenylanthracene and on the hydride of symmetrical γ-diphenylanthracene: A. **Haller** and A. **Guyot**. Phenyloxanthranol reacts with phenyl-magnesium bromide, giving about 50 per cent. of the expected diol. The replacement of the phenyloxanthranol by its methyl ether in this reaction gives a nearly theoretical yield. This, on reduction with sodium amalgam, gives the dihydride of diphenylanthracene.—On some new facts observed by means of a phosphorescent screen: E. **Bichat**.—The direct hydrogenation of the homologues of aniline: Paul **Sabatier** and J. B. **Senderens**. By passing a mixture of hydrogen and the vapours of the alkyl-anilines over reduced nickel at 160° C. to 180° C., cyclohexylethylamine, cyclohexyldiethylamine and cyclohexyldimethylaniline have been obtained, the physical properties of which are given. Cyclohexylmethylaniline was obtained with difficulty from methylaniline by this reaction.—The detonation under water of explosive substances: M. **Jacob**. The phenomena of propagation of the motion are completely different in the cases where the coefficient of compressibility is supposed constant and where it is taken as variable. In the first case, the speed of propagation of the motion is constant, in the latter it is variable, and increases with the pressure.—On the energy in the so-called statical actions, its relation with the quantity of motion and its differentiation from the work: Ernest **Solvay**.—The resistance of the air. The comparison of the direct resistances of different aërial vanes; numerical results: Ch. **Renard**. These results were obtained with the dynamometric balance previously described by the author, and prove the law of the square of the velocity to be exact. Numerical results are given for the coefficients of vanes of different shapes.—On an instrument designed to facilitate calculations in screw-cutting: M. **Mœhlenbruck**.—On the thermal ionisation of saline vapours: G. **Moreau**. A current of air drawn through a saline solution is heated in a porcelain tube to about 1000° C., and the conductivity measured. It was found that the ionisation of the potassium salts studied was not analogous to that observed in a flame, where the influence of the acid radical is very small. The mobilities of the ions also differ in the two cases.—The cryoscopic study of solutions of antimony sulphide: MM. **Guinchant** and **Chrétien**. The lowering of the melting point of pure antimony sulphide by varying quantities of lead and silver sulphides was determined by a thermocouple, the temperature being maintained by an electrical resistance furnace of nickel wire. The average cryoscopic constant found was 790. The value for the latent heat of fusion deduced by the application of van 't Hoff's formula was 16·7 calories; the value determined direct was found to be 17·5 calories. The experimental results obtained for the lowering of the melting point of antimony sulphide by metallic antimony are in accord with the view that the antimony is in the atomic condition.—The estimation of atmospheric formaldehyde: H. **Henriet**. The aldehyde is estimated by drawing the air over mercuric oxide mixed with glass wool at a temperature of 250° C., and estimating the carbon dioxide formed. The accuracy of the method was proved by blank experiments with known amounts of formaldehyde. The conclusion is drawn from these experiments that formaldehyde exists in the air in the proportion of from 2 to 6 grams per 100 cubic metres of air, this being very large compared with ozone, which is present to the extent of 2 or 3 milligrams in the same volume. The author proposes to make a study of its physiological action.—A method for the characterisation of the fatty acids: René **Locquin**. The sodium salt of the acid is treated in ethereal solution with monochloracetone, and the acetol ester thus produced transformed into its semicarbazone, the melting point of which is taken. The melting points of five semicarbazones derived from five fatty acids are given.—The transformation of ortho-azo-alcohols into indazyl derivatives: P. **Freundler**.—The limit of combination of diazobenzene and phenol: Léo **Vignon**.—The modifications of the radiations from the nervous centres under the action of anæsthetics: Jean **Becquerel** and André **Broca**. From the variations of the *n*-rays, as measured by the lustre of a phosphorescent screen, the action of the anæsthetic can be followed, the point when danger to life commences and the point of death being easily distinguished.—On a physical proof of the adaptation between natural reagents and their perceptive organs: Augustin **Charpentier**.—The action of the *n*-rays on biological phenomena: M. **Lambert** and Ed. **Meyer**.—On cases of rapid expulsion of calculi by d'Arsonvalisation: A. **Moutier**.—On the sterilisation of cork: F. **Bordas**. Superheated steam was found to give the best results.—Study of the lypolytic action of the cytoplasma of the castor oil seed: Maurice **Nicloux**.—On the hydrolysing properties of the castor oil seed: Ed. **Urbain** and L. **Saugon**.—On the modifications of the ergographic constants under different experimental conditions: Mlle. I. **Ioteyko**.

DIARY OF SOCIETIES.

THURSDAY, June 2.

Royal Society, at 4.30.—On the Aurora Borealis and the Electric Charge of the Sun: Prof. Svante Arrhenius.—Colours in Metal Glasses and in Metallic Films: J. C. Maxwell Garnett.—On a Direct Method of Measuring the Coefficient of Volume-elasticity of Metals: A. Mallock, F.R.S.—A Method of Measuring Directly High Osmotic Pressures: The Earl of Berkeley and E. G. J. Hartley.—The Advancing Front of the Train of Waves Emitted by a Theoretical Hertzian Oscillator: Prof. A. E. H. Love, F.R.S.—On the General Circulation of the Atmosphere in Middle and Higher Latitudes: Dr. W. N. Shaw, F.R.S.—On the Magnetic Changes of Length in Annealed Rods of Cobalt and Nickel: Dr. S. Bidwell, F.R.S.—On the Electric Effect of Rotating a Dielectric in a Magnetic Field: Dr. H. A. Wilson.

Linnean Society, at 8.—The Species of Impatiens in the Wallichian Herbarium: Sir Jos. D. Hooker, G.C.S.I., F.R.S.—Biscayan Plankton. Part III. Chætognathia: Dr. G. H. Fowler.—The Flow of Fluids in Plant-stems: Prof. R. J. Anderson.

Röntgen Society, at 8.30.—Experiments to Determine the Effects of Form and Winding upon Resonance Phenomena: Dr. Clarence A. Wright.

Institution of Mining Engineers, at 11 a.m.—Suggestions respecting the Institution of Mining Engineers: Prof. R. A. S. Redmayne.—Coal-mining in the Faroe Islands: G. A. Greener.—Tin-mining in the Straits Settlements, with a few Notes regarding Chinese Labour: W. T. Saunders.—Underground Temperatures, especially with regard to Coal-mines: Dr. Hoefer.—The Hammer-Fennel Tachymeter-theodolite: A. O. Eoll.—Notes on the Report of the Departmental Committee on the Use of Electricity in Mines: Sydney F. Walker.—A Comparison of Three-phase and Continuous Currents for Mining Purposes: Roslyn Holiday.—Electric and Compressed-air Locomotives: B. S. Randolph.—Work of Conveyors on Longwall Faces: Robert G. Ware.

Chemical Society, at 8.—*iso*Nitrosocamphor: M. O. Forster.—Imino-Ethers and Allied Compounds corresponding with the Substituted Oxamic Esters: G. D. Lander.—The Action of Heat on α-Hydroxycarboxylic Acids: Part I. α-Hydroxystearic Acid: H. R. Le Sueur.—The Basic Properties of Oxygen. Additive Derivatives of the Halogen Acids and Organic Compounds and the Higher Valencies of Oxygen. Asymmetric Oxygen: E. H. Archibald and D. McIntosh.

FRIDAY, June 3.

Royal Institution, at 9.—The Development of the Theory of Electrolytic Dissociation: Prof. Svante Arrhenius.

Institution of Mining Engineers, at 10.30 a.m.—The Firing of Babcock Boilers with Coke-oven Gases: T. Y. Greener.—Explosives and Lamp Testing Station at Frameries: Victor Watteyne.—The Transvaal Kromdraai Conglomerates: A. R. Sawyer.—The Southern Rand Goldfield: A. R. Sawyer.—The Occurrence of Cinnabar in British Columbia: G. F. Monckton.—Prevention of Accidents in Winding: John H. Merivale.—Petroleum and its Use for Illumination, Lubricating and Fuel Purposes: P. Dvorkovitz.—The Analytical Valuation of Gas Coals: G. P. Lishman.—A New Process of Chlorination for Mixed Gold and Silver Ores: H. F. Brown.—Graphite-mining in Ceylon and India—Part I. Ceylon: G. A. Stonier.

Geologists' Association, at 8.—The Geology and Prehistoric Anthropology of the Hastings District, with Special Reference to the Excursion of June 11: W. J. Lewis Abbott.

SATURDAY, June 4.

Royal Institution, at 3.—Spitsbergen in the Seventeenth Century: Sir W. Martin Conway.

MONDAY, June 6.

Society of Chemical Industry, at 8.—The loss of Nitre in the Chamber Process: J. K. H. Inglis.—Acetone—its Manufacture and Purification: A. Marshall.—A New Method for the Estimation of Tannin: J. Gordon Parker and E. E. M. Payne.

Aristotelian Society, at 8.—Primary and Secondary Qualities: Prof. G. F. Stout.

Institute of Actuaries, at 5.—Annual General Meeting.

TUESDAY, June 7.

Mineralogical Society, at 8.—On Cobaltiferous Mispickel from Norway: Rev. Mark Fletcher.—On an Improved Form of Refractometer: G. F. Herbert Smith.—Notes on the Development of the Kimberley Diamond Mines, with Lantern Illustrations: Prof. H. A. Miers, F.R.S.

Zoological Society, at 8.30.—On some New or little-known Butterflies, mainly from High Elevations in the N.E. Himalayas: Lieut.-Col. J. Malcolm Fawcett.—On Seasonal Phases in Butterflies: Dr. A. G. Butler.—Note on an Apparently Abnormal Position of the "Brephos" within the Body of a Skink (*Chalcides lineatus*): F. E. Beddard, F.R.S.—On the Rare Rodent *Dinomys branickii*, Peters: Dr. E. A. Goeldi.—On the Black Wild Cat of Transcaucasia: C. Satunin.—On a Buffalo Skull from East Central Africa: R. Lydekker.—On Two New Labyrinthodont Skulls: Dr. A. Smith Woodward, F.R.S.

WEDNESDAY, June 8.

Geological Society, at 8.—The Palæontological Sequence in the Carboniferous Limestone of the Bristol Area: A. Vaughan.—The Evidence for a Non-Sequence between the Keuper and Rhætic Series in North-west Gloucestershire and Worcestershire: L. Richardson.—On a Small Plesiosaurus-Skeleton from the White Lias of Westbury-on-Severn: W. F. Gwinnell.

Victoria Institute, at 4.30.—Annual Meeting. The President, the Lord Chancellor, F.R.S., will deliver the annual address.

THURSDAY, June 9.

Royal Society, at 4.30.—*Probable Papers*:—On the Ossiferous Cave-Deposits of Cyprus, with Descriptions of the Remains of *Elephas cypriotes*: Miss D. M. A. Bate.—On the Structure and Affinities of Palæodiscus and Agelacrinus: W. K. Spencer.—On the Physical Relation of Chloroform to Blood: Dr. A. D. Waller, F.R.S.—Contributions to the Study of the Action of Sea-Snake Venoms: Sir Thomas R. Fraser, F.R.S., and Major R. H. Elliot, I.M.S.—On the Action of the Venom of *Bungarus coeruleus* (the Common Krait): Major R. H. Elliot, I.M.S., W. C. Sillar and G. S. Carmichael.—On the Combining Properties of Serum-Complements and on Complementoids: Prof. R. Muir and C. H. Browning.—Notes on the Statolith Theory of Geotropism: F. Darwin, For.Sec.R.S., and D. F. M. Pertz.

Mathematical Society, at 5.30.—The Application of Poisson's Formula to Discontinuous Disturbances: Lord Rayleigh.—Some Expansions for the Periods of the Jacobian Elliptic Functions: H. Bateman.—Types of Covariants of any Degree in the Coefficients of Each of Any Number of Binary Quantics: P. W. Wood.

Institution of Electrical Engineers, at 5.—Annual General Meeting.

FRIDAY, June 10.

Royal Astronomical Society, at 5.

Physical Society, at 8.

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